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length the space o p will admit. In cases where there is no portion of the work to form a back centre, it can be obtained by clamping one to any convenient part of the work.

No. XI.

EXPANDING MANDREL.

The SILVER MEDAL was presented to Mr. JOHN HICK, Junior, of Bolton, Lancashire, for his Expanding Mandrel for Turning Lathes; a Model of which has been placed in the Society's Repository.

SIR,

London, 27th March.

I BEG leave to offer for the acceptance of the Society my expanding mandrel, which I believe to be quite new, and shall feel proud if the Society think it of sufficient merit to entitle me to any honorary reward.

I am, Sir, &c. &c.

*To the Secretary of the
Society of Arts.*

JOHN HICK.

There are in the construction of steam-engines, mill-gearing, &c. a great number of parts, such as steps for plummer-blocks and other pedestals, also for connecting-rods, cross-heads, &c., bushes for piston-rods, and a variety of other parts which require their outer diameters to be turned true, or concentric, with the hole through

them. The hitherto adopted mode of performing this is by first taking a piece of iron whose diameter shall be a little larger than the hole through the article to be turned upon it; the piece of iron, which is usually called a mandrel, is then turned down or reduced until it is of such a size as to admit of being driven tight into the hole for which it is intended, which being done, the article upon it is ready for turning; but this preparation often requires a longer time than is even occupied in executing the whole of the turning required upon the article for which the mandrel has been so prepared. To diminish this great loss of time, I have invented a mandrel which I call an expanding mandrel, a brief description of which, on referring to the annexed drawing, will shew its advantages.

I do not propose to make one mandrel take more than a certain range of holes; because if it were sufficiently strong for very large holes, it would be inconvenient for very small ones. I have, therefore, adopted the following sizes, viz. :—

1 $\frac{1}{4}$ inch to expand to 1 $\frac{3}{4}$ *		
1 $\frac{3}{4}$	.....	2 $\frac{1}{4}$
2 $\frac{1}{4}$	.....	3
3	.....	4
4	.....	5
5	.....	6 $\frac{1}{2}$
6 $\frac{1}{2}$	.....	8
8	.....	10
and in like proportion.		

We have had some of these sizes in use in our own works about two years, and can speak confidently of

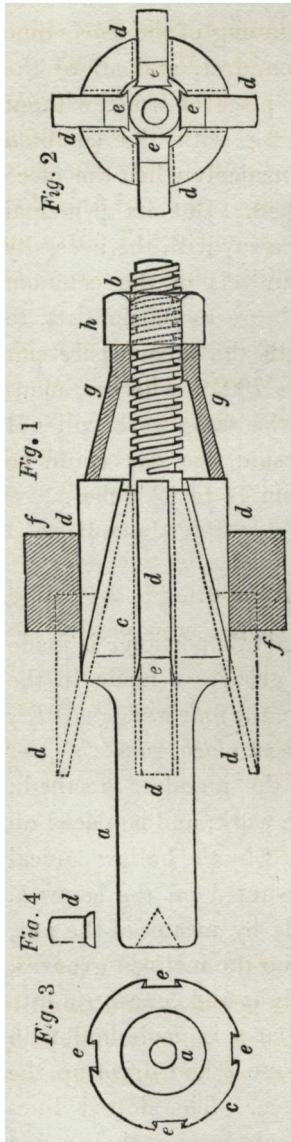
* I commence at 1 $\frac{1}{4}$ inch as that is the smallest size which I think would be generally useful.

their advantages, which effect a saving of the *whole* time required to prepare a common mandrel, and afford the facility of putting on or off any piece of work without damaging it, as is often the case with the common mandrel in *driving* on or off, particularly when the piece of work has been highly finished. But its principal advantage is that of entirely doing away with the necessity of keeping a large stock of mandrels of the common description, amounting, in some large establishments, to four or five tons; and these, with the labour *once* put upon them, will be worth 600*l.* to 700*l.*: whereas, mandrels on my improved plan to do the same work will not cost more than 100*l.*, for which sum two sets could be furnished, including every size from $1\frac{1}{4}$ to 12 inches.

JOHN HICK.

Reference to the Figures.

Fig. 1. *a b* the mandrel; the middle portion *c* is made conical and has four dove-tailed grooves *e* made in the direction of its length, which receive the four wedges *dddd*; these are represented at their lowest place, so as to enter the smallest-sized hole to which the mandrel is suited; the hollow block *ff* represents the work, and is placed on the four wedges; these are followed by the hollow conical collet *gg*, and then by the screw-nut *h* on the screw *b*. The cone *g*, when urged forwards by means of the nut, will drive the four wedges *dddd* up the inclined grooves, and thus fix the mandrel quite tight and concentric into the hole in the block *f*; the collet *g* is made hollow in order that it may pass over the cone *c* and drive up the wedges *d* to any required distance. The dotted lines *ddd* represent the wedges at the extremity of their range within the limits of which the mandrel is adjustable to the



smallest degree of difference in the inside diameters of various articles.

Fig. 2 is a view of the mandrel from the end *b* without the conical collet *g* and nut *h*, the wedges *d* being pushed up to the largest diameter; *eeee* the lower parts of the grooves in which they slide. Fig. 3 is a view of the large end of the cone *c*, shewing the upper ends of the grooves *eeee*. Fig. 4, an end-view of one of the wedges.

The grooves *e* are cut with an engine so as to be perfectly concentric; the wedges are then fitted in and bound tight at the lowest place and there turned quite true and cylindrical; and by means of a smaller collet than *g*, their ends may be turned true and flat; the collet *g* will then always advance them equally.

6 Paragon, New Kent Road,

31st March, 1840.

DEAR SIR,

IN answer to your note of yesterday's date, requesting my opinion of the novelty and utility of Mr. Hick's expanding mandrel, in order that you might communicate the same to the Committee of Mechanics at the Society of Arts, &c. I beg leave to state that in my opinion it will prove an instrument of considerable value to manufacturers of machinery in general.

Although the principle of this invention is not new, inasmuch as it was introduced by Mr. Brunel into a part of his celebrated and well-known block machinery at Portsmouth, yet as far as my knowledge extends, Mr. Hick's invention is a most useful adaptation of that principle to a new purpose. I have no hesitation, therefore, of strongly recommending it to the attention of the Society, that through their means it may be communicated to the public. On seeing the instrument, I was at once convinced of the great facility it would afford in its universal adaptation to holes of any diameter, and was therefore induced to request that Mr. Hick would be kind enough to furnish me with half-a-dozen, in a gradation of sizes from $1\frac{1}{4}$ in. upwards.

I am, &c. &c.

W. A. GRAHAM, Esq.

BRYAN DONKIN.

DEAR SIR,

Lambeth, April 2, 1840.

I HAVE seen Mr. Hick's expanding mandrel, and think it will be found very useful; so much so, that we have ordered one, and understand that other manufacturers have done the same.

I am, &c. &c.

W. A. GRAHAM, Esq.

JOSHUA FIELD.

SIR,

Whitehall Place, 31st March, 1840.

I EXCEEDINGLY regret that a previous engagement prevents my attending the Society of Arts on Thursday next. I have no hesitation in giving my opinion upon the expanding mandrel of Mr. Hick, jun.; namely, that I think it a very ingenious and useful invention, and deserving the patronage of the Society of Arts; and, in conformity with this opinion, I have requested Mr. Hick to send me several sizes of these mandrels for the purpose of adopting them in my establishment.

I am, Sir, &c. &c.

W. A. GRAHAM, Esq.

GEORGE RENNIE.

Secretary, &c. &c.

No. XII.

SCREW BENCH-HOOK FOR CARPENTERS.

The SILVER ISIS MEDAL was presented to Mr. F. E. FRANKLIN, Purton, Wiltshire, for his Screw Bench-Hook for Carpenters; a Model of which has been placed in the Society's Repository.

SIR,

Purton, 10th February, 1840.

HAVING experienced great inconvenience from the old stop used by carpenters in their bench, I beg leave to offer, for the inspection of the Society, one in which the stop is regulated by means of a screw, thereby avoiding